QUARTERLY PROGRESS REPORT
Slurry/Micro-Surface Mix Design Procedure
December 2003

TO: **T. Joe Holland, CALTRANS**
Contract No.: **CALTRANS 65A0151**
Agency **Fugro-BRE, Inc.**
Prepared By: **Jim Moulthrop, Principal Investigator**
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PROJECT OVERVIEW

The overall goal of this research is to improve the performance of slurry seal and micro-surfacing systems through the development of a rational mix design procedure, guidelines and specifications.

Phase I of the project has two major components; the first consists of a literature review and a survey of industry/agencies using slurry and micro-surfacing systems; the second part of Phase I deals with the development of a detailed work plan for Phases II and III.

In Phase II, the project team will evaluate existing and potential new test methods; evaluate successful constructability indicators; conduct ruggedness tests on recommended equipment and procedures; and prepare a report that summarizes all the activities undertaken under the task.

In Phase III the project, team will develop guidelines and specifications, a training program and provide expertise and oversight in the construction of pilot projects intended to validate the recommended design procedures and guidelines. All activities of the study will be documented in a final report.

CURRENT MONTH WORK ACTIVITIES AND COMPLETED TASKS

PHASE I—LITERATURE SEARCH AND WORK PLAN DEVELOPMENT

Task 1—Literature Review and Industry Survey

Literature Review

Completed: The literature review process is completed with all sources reviewed and summarized in the literature review chapter of the Phase I Report. The list of references is given here:

- ASTM D3910-98 and ASTM D6372-99 Practice for Design, Testing and Construction of Slurry Seal and Micro-surfacing respectively
- ISSA Recommended Performance Guidelines for Slurry Seal Mix Design (A105) and Micro-surfacing (A143)
- Texas Transportation Institute (TTI) Reports 0-1289-1 & 1289 2-F
- International Slurry Surfacing Association Conference Proceedings

- Transportation Research Board Publications, Research in Progress
- European Standards EN 12274-1 to 12274-8 Slurry Surfacing Test Methods Part 1 to Part 8
- Transportation Research Laboratory Standards, United Kingdom
- Austroads – Guide to the Selection and Use of Bitumen Emulsions
- German Standards
- French Standards
- CALTRANS Slurry Study
- Technical Guideline: The use of Modified Bituminous Binders in Road Construction. Asphalt Academy c/o Transportek, CSIR
- Pennsylvania Department of Transportation (PADOT) Research Report No. 89-61
- Foundation for Pavement Rehabilitation and Maintenance Research (FPRMR) Friction Evaluation Study
- FHWA Long Term Pavement Performance (-LTPP) SPS-3, 4
- Ministry of Transportation, Ontario: Micro Performance Study

Chapter 2 of the Phase I Report will contain information on:

- Sources of information for the literature review
- Extent of use of slurry seal and microsurfacing systems worldwide
- Results of industry/agencies survey
- Current mix design methods and laboratory tests
- Performance of existing slurry seal and microsurfacing projects and performance-related parameters
- Existing guidelines and specifications
- Summary of findings

Ongoing: The first draft of the Phase I Report, including Chapter 2 – State of The Art/Practice; is currently being reviewed by the project team.

Planned: Although the literature review process is finalized, any new sources will be reviewed as they become available.

Industry and Agency Surveys
Completed: Following discussion with members of the team and CALTRANS, three surveys were designed:

1. Agencies: using the AASHTO LISTSERVE link.

2. Contractors and Manufacturers: in the United States and the international slurry surfacing and microsurfacing industry.

3. Advisory Panel Contractors.

The three proposed survey questionnaires were included in the August 2003 monthly report and discussed at the videoconference kickoff meeting on September 22, 2003. Based on the comments and suggestions of the participants at the videoconference, the questionnaires were revised and included in final form in the September 2003 monthly report.

New: To date, 22 responses have been received from agencies, 23 from industry, and 4 from the advisory panel. The responses to the questionnaires have been analyzed and the primary concerns of agencies, industry, and of the advisory panel have been identified. This analysis is included in the Phase I Report.

Task 2—Work Plans for Phases II and III

Completed:

The first draft of the Phase II work plan has been finalized and will be included in Chapter 3 of the Phase I Report. In summary, five mixes will be included in the laboratory testing factorial. The new approach is to measure the mechanical properties of the mixtures throughout the process. This is broken into construction issues and performance issues (short term and long term).

A test developed in Germany is being proposed as the method by which the mixing characteristics are measured. This will measure a profile of cohesion change during mixing allowing a mixability index and a spreadability index to be defined and specified. The apparatus consists of a special impeller mixer that is attached to a strain measurement device and a computer.

It is proposed that the short-term cohesion build be measured by an automated TB 139 wet cohesion test. This will allow a traffic cohesion and early strength cohesion to be defined and specified. Both tests may be done under a range of test conditions. The apparatus is being developed.

Another cohesion type measurement is the French WTAT that uses a wheel assembly instead of a rubber hose. This test is also being developed for long term testing of abrasion resistance of cured materials.

Ongoing: Chapters 3 and 4 of the Phase I Report are currently being reviewed by the team.

PHASE II—MIX DESIGN PROCEDURE DEVELOPMENT

Task 3—Evaluation of Potential Test Methods

No Activity

Task 4—Evaluation of Successful Constructability Indicators

No Activity

Task 5—Ruggedness Tests of Recommended Equipment and Procedures

No Activity

Task 6—Phase II Report

No Activity

PHASE III— PILOT PROJECTS AND IMPLEMENTATION

Task 7—Evaluation of Potential Test Methods
No Activity

Task 8—Workshop Training Program/Pre-Construction Module
No Activity

Task 9—Pilot Projects/Procedure Validation
No Activity

Task 10—Final Report
No Activity

NEXT MONTH'S WORK PLAN
The activities planned for next month are listed below.

- Coordinate with CALTRANS personnel on an as needed basis
- Finalize the team review of the Phase I Report and submit to CALTRANS for review.

PROBLEMS / RECOMMENDED SOLUTIONS
No problems were encountered during last month and none are anticipated next month.